



SEQUENCE LISTING

<110> Williamson, Richard
Burn, Joanne

<120> Methods and means for modulating cellulose biosynthesis in fiber
producing plants

<130> 021565-122

<140> 10/733,407
<141> 2003-12-12

<150> US 60/432,674
<151> 2002-12-12

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<170> PatentIn version 3.3

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Met	Thr	Met	Leu	Ser	Trp	Ser	Val	Ile	Glu	Tyr	Ser	Ala	Lys	Tyr	Glu				
			180					185					190						
Ala	Ala	Gly	Glu	Leu	Thr	His	Val	Lys	Glu	Leu	Ile	Lys	Trp	Gly	Thr				
		195					200					205							
Asp	Tyr	Phe	Leu	Lys	Thr	Phe	Asn	Ser	Thr	Ala	Asp	Ser	Ile	Asp	Asp				
	210					215					220								
Leu	Val	Ser	Gln	Val	Gly	Ser	Gly	Asn	Thr	Asp	Asp	Gly	Asn	Thr	Asp				
225					230					235					240				
Pro	Asn	Asp	His	Tyr	Cys	Trp	Met	Arg	Pro	Glu	Asp	Met	Asp	Tyr	Lys				
			245						250					255					
Arg	Pro	Val	Thr	Thr	Cys	Asn	Gly	Gly	Cys	Ser	Asp	Leu	Ala	Ala	Glu				

515 520 525
 Lys Gly Gly Trp Lys Trp Arg Asp Ser Lys Lys Pro Asn Pro Asn Thr
 530 535 540
 Ile Glu Gly Ala Met Val Ala Gly Pro Asp Lys Arg Asp Gly Tyr Arg
 545 550 555 560
 Asp Val Arg Met Asn Tyr Asn Tyr Thr Glu Pro Thr Leu Ala Gly Asn
 565 570 575
 Ala Gly Leu Val Ala Ala Leu Val Ala Leu Ser Gly Glu Glu Glu Ala
 580 585 590
 Thr Gly Lys Ile Asp Lys Asn Thr Ile Phe Ser Ala Val Pro Pro Leu
 595 600 605
 Phe Pro Thr Pro Pro Pro Pro Pro Ala Pro Trp Lys Pro
 610 615 620

<210> 6
 <211> 619
 <212> PRT
 <213> cotton

<400> 6

Met Tyr Gly Arg Asp Pro Trp Gly Gly Pro Leu Glu Ile Asn Ala Thr
 1 5 10 15
 Asp Ser Ala Thr Asp Asp Asp Arg Ser Arg Asn Leu Gln Asp Leu Asp
 20 25 30
 Arg Ala Ala Leu Ser Arg Pro Leu Asp Glu Thr Gln Gln Ser Trp Leu
 35 40 45
 Leu Gly Pro Gly Glu Gln Lys Lys Lys Lys Tyr Val Asp Leu Gly
 50 55 60
 Cys Ile Ile Val Ser Arg Lys Ile Phe Val Trp Thr Val Gly Thr Leu
 65 70 75 80
 Leu Val Ser Ala Leu Leu Ala Gly Leu Ile Thr Leu Ile Val Lys Thr
 85 90 95
 Val Pro Arg His His His Arg His Ser Pro Pro Asp Asn Tyr Thr Leu
 100 105 110
 Ala Leu His Lys Ala Leu Met Phe Phe Asn Ala Gln Arg Ser Gly Lys
 115 120 125

Leu Pro Lys His Asn Asn Val Ser Trp Arg Gly Asn Ser Gly Leu Gln
 130 135 140
 Asp Gly Lys Ser Asp Pro Ser Val Leu Met Lys Asp Leu Val Gly Gly
 145 150 155 160
 Tyr Tyr Asp Ala Gly Asp Ala Ile Lys Phe Asn Phe Pro Ala Ser Phe
 165 170 175
 Ser Met Thr Met Leu Ser Trp Ser Val Ile Glu Tyr Ser Ala Lys Tyr
 180 185 190
 Glu Ala Ala Gly Glu Leu Asn His Val Lys Glu Ile Ile Lys Trp Gly
 195 200 205
 Thr Asp Tyr Leu Leu Lys Thr Phe Asn Asn Thr Ala Asp Thr Ile Asp
 210 215 220
 Arg Ile Ala Ala Gln Val Gly Ile Gly Asp Thr Ser Gly Gly Ser Ser
 225 230 235 240
 Ala Pro Asn Asp His Tyr Cys Trp Met Arg Pro Glu Asp Ile Asp Tyr
 245 250 255
 Pro Arg Pro Val Tyr Glu Cys His Ser Cys Ser Asp Leu Ala Ala Glu
 260 265 270
 Met Ala Ala Ala Leu Ala Ser Ala Ser Ile Val Phe Lys Asp Asn Lys
 275 280 285
 Ala Tyr Ser Gln Lys Leu Val His Gly Ala Arg Thr Leu Phe Met Phe
 290 295 300
 Ala Arg Asp Gln Arg Gly Arg Tyr Ser Ala Gly Gly Ser Asp Pro Ala
 305 310 315 320
 Leu Phe Tyr Asn Ser Ser Ser Tyr Trp Asp Glu Phe Val Trp Gly Gly
 325 330 335
 Ala Trp Leu Tyr Tyr Ala Thr Gly Asn Ser Ser Tyr Leu Gln Leu Ala
 340 345 350
 Thr His Pro Lys Leu Ala Lys His Ala Gly Ala Phe Trp Gly Gly Pro
 355 360 365
 Asp Tyr Gly Val Leu Ser Trp Asp Asn Lys Leu Ala Gly Ala Gln Val
 370 375 380

Leu 385 Leu Ser Arg Leu Arg 390 Leu Phe Leu Ser Pro 395 Gly Tyr Pro Tyr Glu 400
 Glu Ile Leu Ser Thr 405 Phe His Asn Gln Thr 410 Ser Ile Ile Met Cys 415 Ser
 Phe Leu Pro Val 420 Phe Thr Ser Phe Asn 425 Arg Thr Lys Gly Gly 430 Leu Ile
 Gln Leu Asn 435 His Gly Arg Pro Gln 440 Pro Leu Gln Tyr Val 445 Val Asn Ala
 Ala Phe 450 Leu Ala Ala Leu Tyr 455 Ser Asp Tyr Leu Asp 460 Thr Ala Asp Thr
 Pro Gly Trp Tyr Cys Gly 470 Pro Asn Phe Tyr Ser 475 Thr Asp Val Leu Arg 480
 Glu Phe Ala Lys Thr 485 Gln Ile Asp Tyr Ile 490 Leu Gly Lys Asn Pro 495 Arg
 Lys Met Ser Tyr 500 Val Val Gly Phe Gly 505 Asn His Tyr Pro Lys 510 His Val
 His His Arg 515 Gly Ala Ser Ile Pro 520 Lys Asn Lys Ile Lys 525 Tyr Asn Cys
 Lys Gly 530 Gly Trp Lys Trp Arg 535 Asp Thr Ser Lys Pro 540 Asn Pro Asn Thr
 Leu Val Gly Ala Met Val 550 Ala Gly Pro Asp Lys 555 His Asp Gly Phe Arg 560
 Asp Val Arg Thr Asn 565 Tyr Asn Tyr Thr Glu 570 Pro Thr Leu Ala Gly 575 Asn
 Ala Gly Leu Val 580 Ala Ala Leu Val Ala 585 Leu Ser Gly Asp Lys 590 Ala Thr
 Val Ile Asp 595 Lys Asn Thr Ile Phe 600 Ser Ala Val Pro Pro 605 Met Phe Pro
 Thr Pro 610 Pro Pro Pro Pro Ala 615 Pro Trp Lys Pro

<210> 7
 <211> 921

<212> PRT

<213> Arabidopsis thaliana

<400> 7

Met Arg Ser Leu Leu Phe Val Leu Ser Leu Ile Cys Phe Cys Ser Gln
1 5 10 15

Thr Ala Leu Ser Trp Lys Lys Glu Glu Phe Arg Ser Cys Asp Gln Thr
20 25 30

Pro Phe Cys Lys Arg Ala Arg Ser Arg Thr Pro Gly Ala Cys Ser Leu
35 40 45

Ile Val Gly Asp Val Ser Ile Thr Asp Gly Asp Leu Val Ala Lys Leu
50 55 60

Leu Pro Lys Ala Pro Asn Gln Gly Asp Gly Asp Gln Ile Lys Pro Leu
65 70 75 80

Ile Leu Ser Leu Ser Val Tyr Lys Asp Gly Ile Val Arg Leu Lys Ile
85 90 95

Asp Glu Asp His Ser Leu Asn Pro Pro Lys Lys Arg Phe Gln Val Pro
100 105 110

Asp Val Val Val Ser Glu Phe Glu Glu Lys Lys Ile Trp Leu Gln Lys
115 120 125

Val Ala Thr Glu Thr Ile Ser Gly Asp Thr Ser Pro Ser Ser Val Val
130 135 140

Tyr Val Ser Asp Gly Tyr Glu Ala Val Val Arg His Asp Pro Phe Glu
145 150 155 160

Val Tyr Val Arg Glu Lys Ser Gly Asp Arg Arg Arg Val Val Ser Leu
165 170 175

Asn Ser His Gly Leu Phe Asp Phe Glu Gln Leu Gly Arg Lys Thr Glu
180 185 190

Gly Asp Asn Trp Glu Glu Lys Phe Arg Thr His Thr Asp Ser Arg Pro
195 200 205

Ser Gly Pro Gln Ser Ile Ser Phe Asp Val Ser Phe Tyr Asp Ser Ser
210 215 220

Phe Val Tyr Gly Ile Pro Glu His Ala Thr Ser Phe Ala Leu Lys Pro
225 230 235 240

Thr Lys Gly Pro Gly Val Glu Glu Ser Glu Pro Tyr Arg Leu Phe Asn
245 250 255

Leu Asp Val Phe Glu Tyr Asp His Glu Ser Pro Phe Gly Leu Tyr Gly
260 265 270

Ser Ile Pro Phe Met Val Ser His Gly Lys Ser Gly Lys Thr Ser Gly
275 280 285

Phe Phe Trp Leu Asn Ala Ala Glu Met Gln Ile Asp Val Leu Ala Asn
290 295 300

Gly Trp Asp Ala Glu Ser Gly Ile Ser Leu Pro Ser Ser His Ser Arg
305 310 315 320

Ile Asp Thr Phe Trp Met Ser Glu Ala Gly Ile Val Asp Thr Phe Phe
325 330 335

Phe Val Gly Pro Glu Pro Lys Asp Val Val Lys Gln Tyr Ala Ser Val
340 345 350

Thr Gly Thr Ser Ala Met Pro Gln Leu Phe Ala Thr Gly Tyr His Gln
355 360 365

Cys Arg Trp Asn Tyr Lys Asp Glu Glu Asp Val Ala Gln Val Asp Ser
370 375 380

Lys Phe Asp Glu His Asp Ile Pro Tyr Asp Val Leu Trp Leu Asp Ile
385 390 395 400

Glu His Thr Asp Gly Lys Arg Tyr Phe Thr Trp Asp Ser Val Leu Phe
405 410 415

Pro His Pro Glu Glu Met Gln Lys Lys Leu Ala Ala Lys Gly Arg Lys
420 425 430

Met Val Thr Ile Val Asp Pro His Ile Lys Arg Asp Asp Ser Tyr Phe
435 440 445

Leu His Lys Glu Ala Thr Gln Met Gly Tyr Tyr Val Lys Asp Ser Ser
450 455 460

Gly Lys Asp Phe Asp Gly Trp Cys Trp Pro Gly Ser Ser Ser Tyr Ile
465 470 475 480

Asp Met Leu Ser Pro Glu Ile Arg Lys Trp Trp Gly Gly Arg Phe Ser
485 490 495

Tyr Lys Asn Tyr Val Gly Ser Thr Pro Ser Leu Tyr Thr Trp Asn Asp
 500 505 510

Met Asn Glu Pro Ser Val Phe Asn Gly Pro Glu Val Thr Met Pro Arg
 515 520 525

Asp Ala Leu His Val Gly Gly Val Glu His Arg Glu Val His Asn Ala
 530 535 540

Tyr Gly Tyr Tyr Phe His Met Ala Thr Ser Asp Gly Leu Val Met Arg
 545 550 555 560

Glu Glu Gly Lys Asp Arg Pro Phe Val Leu Ser Arg Ala Ile Phe Pro
 565 570 575

Gly Thr Gln Arg Tyr Gly Ala Ile Trp Thr Gly Asp Asn Thr Ala Glu
 580 585 590

Trp Glu His Leu Arg Val Ser Ile Pro Met Ile Leu Thr Leu Gly Leu
 595 600 605

Thr Gly Ile Thr Phe Ser Gly Ala Asp Ile Gly Gly Phe Phe Gly Asn
 610 615 620

Pro Glu Pro Glu Leu Leu Val Arg Trp Tyr Gln Val Gly Ala Tyr Tyr
 625 630 635 640

Pro Phe Phe Arg Gly His Ala His His Asp Thr Lys Arg Arg Glu Pro
 645 650 655

Trp Leu Phe Gly Glu Arg Asn Thr Glu Leu Met Arg Asp Ala Ile His
 660 665 670

Thr Arg Tyr Thr Leu Leu Pro Tyr Phe Tyr Thr Leu Phe Arg Glu Ala
 675 680 685

Asn Val Thr Gly Val Pro Val Val Arg Pro Leu Trp Met Glu Phe Pro
 690 695 700

Gln Asp Glu Ala Thr Phe Ser Asn Asp Glu Ala Phe Met Val Gly Ser
 705 710 715 720

Gly Leu Leu Val Gln Gly Val Tyr Thr Lys Gly Thr Thr Gln Ala Ser
 725 730 735

Val Tyr Leu Pro Gly Lys Glu Ser Trp Tyr Asp Leu Arg Asn Gly Lys
 740 745 750

Thr Tyr Val Gly Gly Lys Thr His Lys Met Asp Ala Pro Glu Glu Ser
755 760 765

Ile Pro Ala Phe Gln Lys Ala Gly Thr Ile Ile Pro Arg Lys Asp Arg
770 775 780

Phe Arg Arg Ser Ser Ser Gln Met Asp Asn Asp Pro Tyr Thr Leu Val
785 790 795 800

Val Ala Leu Asn Ser Ser Gln Glu Ala Glu Gly Glu Leu Tyr Ile Asp
805 810 815

Asp Gly Lys Ser Phe Glu Phe Arg Arg Gly Ser Tyr Ile His Arg Arg
820 825 830

Phe Val Phe Ser Lys Gly Val Leu Thr Ser Thr Asn Leu Ala Pro Pro
835 840 845

Glu Ala Arg Leu Ser Ser Gln Cys Leu Ile Asp Arg Ile Ile Leu Leu
850 855 860

Gly His Ser Ser Gly Pro Lys Ser Ala Leu Val Glu Pro Leu Asn Gln
865 870 875 880

Lys Ala Glu Ile Glu Met Gly Pro Leu Arg Met Gly Gly Leu Val Ala
885 890 895

Ser Ser Gly Thr Lys Val Leu Thr Ile Arg Lys Pro Gly Val Arg Val
900 905 910

Asp Gln Asp Trp Thr Val Lys Ile Leu
915 920

<210> 8
<211> 524
<212> PRT
<213> cotton

<400> 8

Tyr Asp Val Leu Trp Leu Asp Ile Glu His Thr Asp Gly Lys Arg Tyr
1 5 10 15

Phe Thr Trp Asp Lys Met Leu Phe Pro His Pro Glu Glu Met Gln Arg
20 25 30

Lys Leu Ala Ala Lys Gly Arg His Met Val Thr Ile Val Asp Pro His
35 40 45

Ile Lys Arg Asp Glu Ser Phe His Leu His Lys Asp Ala Ser Gln Arg
 50 55 60
 Gly Tyr Tyr Val Lys Asp Ala Thr Gly Lys Asp Tyr Asp Gly Trp Cys
 65 70 75 80
 Trp Pro Gly Ser Ser Ser Tyr Pro Asp Met Leu Asn Pro Glu Ile Arg
 85 90 95
 Ser Trp Trp Ala Glu Lys Phe Ser Tyr Asp Asn Tyr Val Gly Ser Thr
 100 105 110
 Pro Ser Leu Tyr Ile Trp Asn Asp Met Asn Glu Pro Ser Val Phe Asn
 115 120 125
 Gly Pro Glu Val Thr Met Pro Arg Asp Ala Leu His Val Gly Gly Val
 130 135 140
 Glu His Arg Glu Leu His Asn Ala Tyr Gly Tyr Tyr Phe His Met Ala
 145 150 155 160
 Thr Ala Glu Gly Leu Leu Lys Arg Gly Asp Gly Lys Asp Arg Pro Phe
 165 170 175
 Val Leu Ser Arg Ala Phe Phe Ala Gly Ser Gln Arg Tyr Gly Ala Val
 180 185 190
 Trp Thr Gly Asp Asn Ser Ala Asp Trp Asp His Leu Arg Val Ser Val
 195 200 205
 Pro Met Val Leu Thr Leu Gly Leu Thr Gly Met Thr Phe Ser Gly Ala
 210 215 220
 Asp Val Gly Gly Phe Phe Gly Asn Pro Glu Pro Glu Leu Leu Val Arg
 225 230 235 240
 Trp Tyr Gln Leu Gly Ala Tyr Tyr Pro Phe Phe Arg Gly His Ala His
 245 250 255
 His Asp Thr Lys Arg Arg Glu Pro Trp Leu Phe Gly Glu Arg Asn Thr
 260 265 270
 Ala Leu Met Arg Asp Ala Ile Arg Ile Arg Tyr Thr Leu Leu Pro Tyr
 275 280 285
 Phe Tyr Thr Leu Phe Arg Glu Ala Asn Val Ser Gly Val Pro Val Val
 290 295 300

Arg Pro Leu Trp Met Glu Phe Pro Ser Asp Glu Ala Ala Phe Ser Asn
305 310 315 320

Asp Glu Ala Phe Met Val Gly Asn Ser Leu Leu Val Gln Gly Ile Tyr
325 330 335

Thr Ala Arg Ala Lys His Ala Ser Val Tyr Leu Pro Gly Lys Glu Ser
340 345 350

Trp Tyr Asp Leu Arg Thr Gly Thr Ala Tyr Lys Gly Gly Lys Val His
355 360 365

Lys Leu Glu Val Ser Glu Glu Ser Ile Pro Ala Phe Gln Arg Ala Gly
370 375 380

Thr Ile Val Pro Arg Lys Asp Arg Phe Arg Arg Ser Ser Thr Gln Met
385 390 395 400

Val His Asp Pro Tyr Thr Leu Val Ile Ala Leu Asn Ser Ser Gln Ala
405 410 415

Ala Glu Gly Glu Leu Tyr Val Asp Asp Gly Lys Ser Tyr Asp Phe Lys
420 425 430

His Gly Ala Tyr Ile His Arg Arg Phe Val Phe Ser Asn Gly His Leu
435 440 445

Thr Ser Ser Pro Val Gly Asn Ser Arg Phe Ser Ser Asp Cys Ile Ile
450 455 460

Glu Arg Val Ile Leu Leu Gly Phe Thr Pro Gly Ala Lys Thr Ala Leu
465 470 475 480

Val Glu Pro Gly Asn Gln Lys Ala Glu Ile Glu Leu Gly Pro Leu Arg
485 490 495

Phe Gly Gly Gln His Ala Ala Val Ala Val Thr Ile Arg Lys Pro Gly
500 505 510

Val Arg Val Ala Glu Asp Trp Lys Ile Lys Ile Leu
515 520

<210> 9
<211> 2766
<212> DNA
<213> Arabidopsis thaliana

<400> 9
atgagatctc ttctctttgt actatcactc atttgctttt gctctcaaac agcactttca 60

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cgtactcccc	gcgcgtgttc	tctaattgtc	ggcgatgttt	ccatcactga	tgagatctc	180
gtagcgaagc	ttctaccgaa	agcgccta	caaggcgatg	gggatcagat	caagccgttg	240
attctttctc	tctcagttta	caaggatggg	atcgtgcggc	ttaaaatcga	tgaggaccat	300
tcgttgaacc	cgccgaagaa	gaggttccaa	gttcctgatg	tggtagtgtc	tgagtttgag	360
gagaagaaga	tctggctgca	gaaagtagcg	acggagacga	tctctggaga	cactagtccg	420
tcttcagtag	tttatgtatc	cgatggttac	gaggcggttg	tgcgacacga	tccgtttgag	480
gtgtatgtgc	gtgagaaatc	aggtgatcgc	cgtcgcgttg	tgtcattgaa	ttctcatgga	540
ttatttgatt	ttgagcagtt	ggggaggaaa	actgaaggag	ataactggga	agagaaat	600
aggactcata	cagattctag	accatctggt	cctcaatcta	ttagtttcga	tgtttcgttt	660
tatgattcca	gtttcgttta	tggaattcct	gaacacgcca	ctagcttcgc	gttgaagcct	720
accaagggtc	ctggagttga	ggaatctgaa	ccctacaggc	tttttaatct	agatgtgttt	780
gaatacgatc	atgaatcacc	gtttgggctt	tacgggtcga	ttccgttc	ggtttcgc	840
gggaagtctg	gtaaaacttc	aggatTTTTT	tggttgaatg	ctgcggaaat	gcagattgat	900
gtgttggtta	atggttggga	tgagagag	ggtatttctt	tgcttcttag	tcacagtagg	960
atcgacacat	tctggatgag	cgaggcagg	attgtggata	cattcttttt	cgttgggcct	1020
gagccaaagg	atgttgtaaa	gcagtatgca	agtgtgacag	gtacttcagc	catgcctcag	1080
ttgtttgcca	ctggttatca	tcaatgtagg	tggaactaca	aagatgagga	ggatgtggca	1140
caggtggact	cgaaattcga	tgaacacgat	attccttatg	atgttctctg	gcttgacatt	1200
gagcatacag	atgggaagag	atactttaca	tgggatagtg	tgttgtttcc	tcacccagag	1260
gagatgcaaa	agaaattggc	tgcaaaggg	aggaagatgg	tgaccattgt	ggatcctcat	1320
atcaagaggg	atgactcata	cttcttacac	aaagaggcta	ctcagatggg	atactatgtt	1380
aaggattcat	ctggaaaaga	ctttgatggt	tgggtgctggc	ctggttc	atcttacatt	1440
gatatgttga	gcccagagat	tagaaaatgg	tggggtggga	ggttctcgta	taagaactat	1500
gttggttcaa	ctccatcatt	gtacacctgg	aatgacatga	atgagccttc	tgtattcaat	1560
ggtcccagag	ttactatgcc	aagagatgca	ttacatgttg	ggggtgttga	acacagagaa	1620
gttcataacg	catatggata	ttacttcac	atggcgactt	ccgatggact	tgttatgcgt	1680
gaagaaggaa	aggataggcc	ttttgtattg	tcaagagcaa	tctttcccgg	cactcaaaga	1740
tacggagcaa	tttggtactg	agataacaca	gccgaatggg	aacaccttag	agtctccatt	1800
ccaatgatat	tgacacttgg	tcttactgga	attacattct	ctggagctga	tattggtggg	1860
ttttttggaa	atcctgaacc	agaacttcta	gttaggtggt	accaagtggg	tgcttactat	1920
ccatttttca	ggggtcatgc	tcatcacgat	acaaaagac	gagagccttg	gttgtttggt	1980

gaacggaaca cagaactcat gagagatgcc atacacactc gttacacact gctcccatac	2040
ttctacacgt tggttcagaga agcaaacggt acgggtgttc ctgttgtagc cccattatgg	2100
atggaattcc cgcaagatga agctactttt agcaacgatg aagccttcac ggtcggtagt	2160
ggtctactgg ttcaaggagt ttacaccaag ggaacaacgc aagcttccgt gtatttgcct	2220
ggcaaagaat catggtatga cttgagaaac ggtaagactt acgttggagg caagactcac	2280
aagatggatg ctccagagga gagtattcct gcgtttcaaa aggcaggaac catcatccca	2340
aggaaggacc gggttaggcg aagtctctct caaatggaca atgaccta tactttggtg	2400
gtagctttga acagttctca agaagcagaa ggtgaactct acatcgatga cggcaaaagc	2460
tttgaattca gacgaggctc ttacatccat cgtcgttcg tcttctcaaa ggggtgttct	2520
acatcaacga acttagctcc tccagaagct cgtctctctt cccaatgctt gatcgacaga	2580
attatcctct tgggacacag ctcaggtcca aaatctgcgt tggtggaacc gttgaatcaa	2640
aaggcagaga ttgagatggg acctctgcga atgggtgggc ttgtagcttc ctcgggtaca	2700
aaggtgttga ctatccgcaa accgggtgtt cgagtggacc aagactggac cgtaaagatt	2760
ctgtga	2766

<210> 10
 <211> 29
 <212> DNA
 <213> Artificial sequence

<220>
 <223> oligonucleotide PCR primer

<400> 10	
ccgctcgagc gggcattttc cgcccacta	29

<210> 11
 <211> 29
 <212> DNA
 <213> Artificial sequence

<220>
 <223> oligonucleotide PCR primer

<400> 11	
cgggatcccg tcacacatgg acagaagaa	29

<210> 12
 <211> 19
 <212> DNA
 <213> Artificial sequence

<220>
 <223> oligonucleotide PCR primer

<400> 12	
gacggcgtct agaagattc	19

<210> 13
 <211> 19
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> oligonucleotide PCR primer

 <400> 13
 taacttatcg ggcttctgc 19

<210> 14
 <211> 21
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> oligonucleotide PCR primer

 <400> 14
 ccctcgcttg gtacaaggta t 21

<210> 15
 <211> 21
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> oligonucleotide PCR primer

 <400> 15
 tcctgatcct ctcaccacgt a 21

<210> 16
 <211> 21
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> oligonucleotide PCR primer

 <400> 16
 cgtagtggtc tactggttca a 21

<210> 17
 <211> 21
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> oligonucleotide PCR primer

 <400> 17
 tgagctgtgt cccaagagga t 21

<210> 18
 <211> 21
 <212> DNA

<213> Artificial Sequence
 <220>
 <223> oligonucleotide PCR primer
 <400> 18
 ggtgatgagg ataccagcga t 21

 <210> 19
 <211> 21
 <212> DNA
 <213> Artificial Sequence
 <220>
 <223> oligonucleotide PCR primer
 <400> 19
 cccactccct aaccggagtt t 21

 <210> 20
 <211> 35
 <212> DNA
 <213> Artificial Sequence
 <220>
 <223> oligonucleotide PCR primer
 <400> 20
 ccgctcgagc ggtttcactc acaactgtgg tctct 35

 <210> 21
 <211> 34
 <212> DNA
 <213> Artificial Sequence
 <220>
 <223> oligonucleotide PCR primer
 <400> 21
 ccgctcgagc ggtctcctaa gtcctaacc cata 34

 <210> 22
 <211> 21
 <212> DNA
 <213> Artificial Sequence
 <220>
 <223> oligonucleotide PCR primer
 <400> 22
 cgggatgaag aggatgtaga g 21

 <210> 23
 <211> 21
 <212> DNA
 <213> Artificial Sequence
 <220>
 <223> oligonucleotide PCR primer

<400> 23
gaacccctga gatgatccca a

21

<210> 24
<211> 617
<212> PRT
<213> tomato

<400> 24

Met Tyr Gly Arg Asp Pro Trp Gly Gly Pro Leu Glu Ile His Thr Ala
1 5 10 15

Asp Ser Ala Thr Asp Asp Asp Arg Ser Arg Asn Leu Gln Asp Phe Asp
20 25 30

Arg Ala Ala Met Ser Arg Ser Leu Asp Glu Thr Gln Gln Ser Trp Leu
35 40 45

Leu Gly Pro Thr Glu Gln Lys Lys Lys Lys Tyr Val Asp Leu Gly Cys
50 55 60

Ile Ile Val Ser Arg Lys Ile Phe Lys Trp Thr Val Gly Cys Ile Ile
65 70 75 80

Ala Ala Ala Leu Leu Ala Gly Phe Ile Thr Met Ile Val Lys Leu Val
85 90 95

Pro Arg His Lys His His Asn Pro Pro Pro Asp Asn Tyr Thr Leu Ala
100 105 110

Leu Arg Lys Ala Leu Met Phe Phe Asn Ala Gln Lys Ser Gly Lys Leu
115 120 125

Pro Lys His Asn Asn Val Ser Trp Arg Gly Asn Ser Cys Leu Gln Asp
130 135 140

Gly Lys Ser Asp Asp Ser Thr Met Phe Lys Asn Leu Val Gly Gly Tyr
145 150 155 160

Tyr Asp Ala Gly Asp Ala Ile Lys Phe Asn Phe Pro Gln Ser Phe Ala
165 170 175

Leu Thr Met Leu Ser Trp Ser Val Ile Glu Tyr Ser Ala Lys Tyr Glu
180 185 190

Ala Ala Gly Glu Leu Ala His Val Lys Asp Thr Ile Lys Trp Gly Thr
195 200 205

Asp Tyr Leu Leu Lys Thr Phe Asn Ser Ser Ala Asp Thr Ile Asp Arg
 210 215 220

Ile Ala Ala Gln Val Gly Lys Gly Asp Thr Thr Gly Gly Ala Thr Asp
 225 230 235 240

Pro Asn Asp His Tyr Cys Trp Val Arg Pro Glu Asp Ile Asp Tyr Ala
 245 250 255

Arg Pro Val Thr Glu Cys His Gly Cys Ser Asp Leu Ala Ala Glu Met
 260 265 270

Ala Ala Ala Leu Ala Ser Ala Ser Ile Val Phe Lys Asp Asn Lys Ala
 275 280 285

Tyr Ser Gln Lys Leu Val His Gly Ala Arg Thr Leu Phe Lys Phe Ser
 290 295 300

Arg Asp Gln Arg Gly Arg Tyr Ser Val Gly Asn Glu Ala Glu Thr Phe
 305 310 315 320

Tyr Asn Ser Thr Gly Tyr Trp Asp Glu Phe Ile Trp Gly Ala Ala Trp
 325 330 335

Leu Tyr Tyr Ala Thr Gly Asn Ser Ser Tyr Leu Gln Leu Ala Thr Thr
 340 345 350

Pro Gly Ile Ala Lys His Ala Gly Ala Phe Trp Gly Gly Pro Asp Tyr
 355 360 365

Gly Val Leu Ser Trp Asp Asn Lys Leu Thr Gly Ala Gln Val Leu Leu
 370 375 380

Ser Arg Met Arg Leu Phe Leu Ser Pro Gly Tyr Pro Tyr Glu Glu Ile
 385 390 395 400

Leu Arg Thr Phe His Asn Gln Thr Ser Ile Ile Met Cys Ser Tyr Leu
 405 410 415

Pro Ile Phe Thr Ser Phe Asn Arg Thr Lys Gly Gly Leu Ile Gln Leu
 420 425 430

Asn His Gly Arg Pro Gln Pro Leu Gln Tyr Val Val Asn Ala Ala Phe
 435 440 445

Leu Ala Thr Leu Phe Ser Asp Tyr Leu Ala Ala Ala Asp Thr Pro Gly
 450 455 460

Trp Tyr Cys Gly Pro Asn Phe Tyr Ser Thr Asp Val Leu Arg Lys Phe
465 470 475 480

Ala Glu Thr Gln Ile Asp Tyr Ile Leu Gly Lys Asn Pro Arg Lys Met
485 490 495

Ser Tyr Val Val Gly Phe Gly Asn His Tyr Pro Lys His Val His His
500 505 510

Arg Gly Ala Ser Ile Pro Lys Asn Lys Val Lys Tyr Asn Cys Lys Gly
515 520 525

Gly Trp Lys Tyr Arg Asp Ser Ser Lys Ala Asn Pro Asn Thr Ile Val
530 535 540

Gly Ala Met Val Ala Gly Pro Asp Lys His Asp Gly Phe Arg Asp Val
545 550 555 560

Arg Ser Asn Tyr Asn Tyr Thr Glu Pro Thr Leu Ala Gly Asn Ala Gly
565 570 575

Leu Val Ala Ala Leu Val Ala Leu Ser Gly Asp Arg Asp Val Gly Ile
580 585 590

Asp Lys Asn Thr Leu Phe Ser Ala Val Pro Pro Met Phe Pro Thr Pro
595 600 605

Pro Pro Pro Pro Ala Pro Trp Lys Pro
610 615

<210> 25
<211> 621
<212> PRT
<213> Brassica

<400> 25

Met Tyr Gly Arg Asp Pro Trp Gly Gly Pro Leu Glu Ile His Ala Thr
1 5 10 15

Asp Ser Ala Thr Asp Asp Asp Arg Ser Arg Asn Leu Asn Asp Ile Asp
20 25 30

Arg Ala Ala Leu Ser Arg Pro Leu Asp Glu Thr Gln Gln Ser Trp Leu
35 40 45

Leu Gly Pro Thr Glu Gln Lys Lys Lys Lys Tyr Val Asp Leu Gly Cys
50 55 60

Ile Ile Val Ser Arg Lys Ile Phe Val Trp Thr Val Gly Thr Ile Val
- 25 -

65					70					75				80
Ala	Ala	Ala	Leu	Leu ₈₅	Ala	Gly	Phe	Ile	Thr ₉₀	Leu	Ile	Val	Lys	Thr ₉₅ Val
Pro	Arg	His	His ₁₀₀	Arg	Lys	Thr	Pro	Pro ₁₀₅	Pro	Asp	Asn	Tyr	Thr ₁₁₀	Ile Ala
Leu	His	Lys ₁₁₅	Ala	Leu	Lys	Phe	Phe ₁₂₀	Asn	Ala	Gln	Lys	Ser ₁₂₅	Gly	Lys Leu
Pro	Arg ₁₃₀	His	Asn	Asn	Val	Ser ₁₃₅	Trp	Arg	Gly	Asn	Ser ₁₄₀	Gly	Leu	Gln Asp
Gly ₁₄₅	Lys	Gly	Asp	Ser	Gly ₁₅₀	Ser	Phe	Tyr	Lys	Asp ₁₅₅	Leu	Val	Gly	Gly Tyr ₁₆₀
Tyr	Asp	Ala	Gly	Asp ₁₆₅	Ala	Ile	Lys	Phe	Asn ₁₇₀	Phe	Pro	Met	Ala	Tyr ₁₇₅ Ala
Met	Thr	Met	Leu ₁₈₀	Ser	Trp	Ser	Val	Ile ₁₈₅	Glu	Tyr	Ser	Ala	Lys ₁₉₀	Tyr Glu
Ala	Ala	Gly ₁₉₅	Glu	Leu	Val	His	Val ₂₀₀	Lys	Glu	Leu	Ile	Lys ₂₀₅	Trp	Gly Thr
Asp	Tyr ₂₁₀	Phe	Leu	Lys	Thr	Phe ₂₁₅	Asn	Ser	Thr	Ala	Asp ₂₂₀	Ser	Ile	Asp Asp
Leu ₂₂₅	Val	Ser	Gln	Val	Gly ₂₃₀	Ser	Gly	Asn	Thr	Asp ₂₃₅	Asp	Gly	Ser	Thr Asp ₂₄₀
Pro	Asn	Asp	His	Tyr ₂₄₅	Cys	Trp	Met	Arg	Pro ₂₅₀	Glu	Asp	Met	Asp	Tyr ₂₅₅ Lys
Arg	Pro	Val	Thr ₂₆₀	Thr	Cys	Asn	Gly	Gly ₂₆₅	Cys	Ser	Asp	Leu	Ala ₂₇₀	Ala Glu
Met	Ala	Ala ₂₇₅	Ala	Leu	Ala	Ser	Ala ₂₈₀	Ser	Ile	Val	Phe	Lys ₂₈₅	Asp	Asn Arg
Glu	Tyr ₂₉₀	Ser	Lys	Lys	Leu	Val ₂₉₅	His	Gly	Ala	Lys	Thr	Val	Tyr	Gln Phe
Gly ₃₀₅	Arg	Thr	Arg	Arg	Gly ₃₁₀	Arg	Tyr	Ser	Ala	Gly ₃₁₅	Thr	Ala	Glu	Ser Ala ₃₂₀
Lys	Phe	Tyr	Asn	Ser	Ser	Met	Tyr	Trp	Asp	Glu	Phe	Ile	Trp	Gly Gly

Gly Asp Asn Trp Glu Glu Lys Phe Arg Thr His Thr Asp Ser Arg Pro
 195 200 205
 Ser Gly Pro Gln Ser Ile Ser Phe Asp Val Ser Phe Tyr Asp Ser Ser
 210 215 220
 Phe Val Tyr Gly Ile Pro Glu His Ala Thr Ser Phe Ala Leu Lys Pro
 225 230 235 240
 Thr Lys Gly Pro Gly Val Glu Glu Ser Glu Pro Tyr Arg Leu Phe Asn
 245 250 255
 Leu Asp Val Phe Glu Tyr Asp His Glu Ser Pro Phe Gly Leu Tyr Gly
 260 265 270
 Ser Ile Pro Phe Met Val Ser His Gly Lys Ser Gly Lys Thr Ser Gly
 275 280 285
 Phe Phe Trp Leu Asn Ala Ala Glu Met Gln Ile Asp Val Leu Ala Asn
 290 300
 Gly Trp Asp Ala Glu Ser Gly Ile Ser Leu Pro Ser Ser His Ser Arg
 305 310 315 320
 Ile Asp Thr Phe Trp Met Ser Glu Ala Gly Ile Val Asp Thr Phe Phe
 325 330 335
 Phe Val Gly Pro Glu Pro Lys Asp Val Val Lys Gln Tyr Ala Ser Val
 340 345 350
 Thr Gly Thr Ser Ala Met Pro Gln Leu Phe Ala Thr Gly Tyr His Gln
 355 360 365
 Cys Arg Trp Asn Tyr Lys Asp Glu Glu Asp Val Ala Gln Val Asp Ser
 370 375 380
 Lys Phe Asp Glu His Asp Ile Pro Tyr Asp Val Leu Trp Leu Asp Ile
 385 390 395 400
 Glu His Thr Asp Gly Lys Arg Tyr Phe Thr Trp Asp Ser Val Leu Phe
 405 410 415
 Pro His Pro Glu Glu Met Gln Lys Lys Leu Ala Ala Lys Gly Arg Lys
 420 425 430
 Met Val Thr Ile Val Asp Pro His Ile Lys Arg Asp Asp Ser Tyr Phe
 435 440 445

Leu His Lys Glu Ala Thr Gln Met Gly Tyr Tyr Val Lys Asp Ser Ser
 450 455 460
 Gly Lys Asp Phe Asp Gly Trp Cys Trp Pro Gly Ser Ser Ser Tyr Ile
 465 470 475 480
 Asp Met Leu Ser Pro Glu Ile Arg Lys Trp Trp Gly Gly Arg Phe Ser
 485 490 495
 Tyr Lys Asn Tyr Val Gly Ser Thr Pro Ser Leu Tyr Thr Trp Asn Asp
 500 505 510
 Met Asn Glu Pro Ser Val Phe Asn Gly Pro Glu Val Thr Met Pro Arg
 515 520 525
 Asp Ala Leu His Val Gly Gly Val Glu His Arg Glu Val His Asn Ala
 530 535 540
 Tyr Gly Tyr Tyr Phe His Met Ala Thr Ser Asp Gly Leu Val Met Arg
 545 550 555 560
 Glu Glu Gly Lys Asp Arg Pro Phe Val Leu Ser Arg Ala Ile Phe Pro
 565 570 575
 Gly Thr Gln Arg Tyr Gly Ala Ile Trp Thr Gly Asp Asn Thr Ala Glu
 580 585 590
 Trp Glu His Leu Arg Val Ser Ile Pro Met Ile Leu Thr Leu Gly Leu
 595 600 605
 Thr Gly Ile Thr Phe Ser Gly Ala Asp Ile Gly Gly Phe Phe Gly Asn
 610 615 620
 Pro Glu Pro Glu Leu Leu Val Arg Trp Tyr Gln Val Gly Ala Tyr Tyr
 625 630 635 640
 Pro Phe Phe Arg Gly His Ala His His Asp Thr Lys Arg Arg Glu Pro
 645 650 655
 Trp Leu Phe Gly Glu Arg Asn Thr Glu Leu Met Arg Asp Ala Ile His
 660 665 670
 Thr Arg Tyr Thr Leu Leu Pro Tyr Phe Tyr Thr Leu Phe Arg Glu Ala
 675 680 685
 Asn Val Thr Gly Val Pro Val Val Arg Pro Leu Trp Met Glu Phe Pro
 690 695 700

Gln Asp Glu Ala Thr Phe Ser Asn Asp Glu Ala Phe Met Val Gly Ser
 705 710 715 720
 Gly Leu Leu Val Gln Gly Val Tyr Thr Lys Gly Thr Thr Gln Ala Ser
 725 730 735
 Val Tyr Leu Pro Gly Lys Glu Ser Trp Tyr Asp Leu Arg Asn Gly Lys
 740 745 750
 Thr Tyr Val Gly Gly Lys Thr His Lys Met Asp Ala Pro Glu Glu Ser
 755 760 765
 Ile Pro Ala Phe Gln Lys Ala Gly Thr Ile Ile Pro Arg Lys Asp Arg
 770 775 780
 Phe Arg Arg Ser Ser Ser Gln Met Asp Asn Asp Pro Tyr Thr Leu Val
 785 790 795 800
 Val Ala Leu Asn Ser Ser Gln Glu Ala Glu Gly Glu Leu Tyr Ile Asp
 805 810 815
 Asp Gly Lys Ser Phe Glu Phe Arg Arg Gly Ser Tyr Ile His Arg Arg
 820 825 830
 Phe Val Phe Ser Lys Gly Val Leu Thr Ser Thr Asn Leu Ala Pro Pro
 835 840 845
 Glu Ala Arg Leu Ser Ser Gln Cys Leu Ile Asp Arg Ile Ile Leu Leu
 850 855 860
 Gly His Ser Ser Gly Pro Lys Ser Ala Leu Val Glu Pro Leu Asn Gln
 865 870 875 880
 Lys Ala Glu Ile Glu Met Gly Pro Leu Arg Met Gly Gly Leu Val Ala
 885 890 895
 Ser Ser Gly Thr Lys Val Leu Thr Ile Arg Lys Pro Gly Val Arg Val
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 Asp Gln Asp Trp Thr Val Lys Ile Leu
 915 920

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 Val Thr Ser Ala Tyr Ser Trp Lys Lys Glu Glu Phe Arg Asn Cys Asp
 20 25 30
 Gln Thr Pro Phe Cys Lys Arg Ala Arg Ser Arg Lys Pro Gly Ser Cys
 35 40 45
 Asn Leu Arg Val Ala Asp Val Ser Ile Ser Asp Gly Asp Leu Ile Ala
 50 55 60
 Lys Leu Val Pro Lys Glu Glu Asn Pro Glu Ser Glu Gln Pro Asn Lys
 65 70 75 80
 Pro Leu Val Leu Thr Leu Ser Val Tyr Gln Asp Gly Val Met Arg Val
 85 90 95
 Lys Ile Asp Glu Asp Gln Asn Leu Asn Pro Pro Lys Lys Arg Phe Glu
 100 105 110
 Val Pro Glu Val Ile Glu Glu Asp Phe Leu Asn Thr Lys Leu Trp Leu
 115 120 125
 Thr Arg Val Lys Glu Glu Gln Ile Asp Gly Val Ser Ser Phe Ser Ser
 130 135 140
 Val Phe Tyr Leu Ser Asp Gly Tyr Glu Gly Val Leu Arg His Asp Pro
 145 150 155 160
 Phe Glu Val Phe Ala Arg Glu Ser Gly Ser Gly Lys Arg Val Leu Ser
 165 170 175
 Ile Asn Ser Asn Gly Leu Phe Asp Phe Glu Gln Leu Arg Glu Lys Lys
 180 185 190
 Glu Gly Asp Asp Trp Glu Glu Lys Phe Arg Ser His Thr Asp Thr Arg
 195 200 205
 Pro Tyr Gly Pro Gln Ser Ile Ser Phe Asp Val Ser Phe Tyr Gly Ala
 210 215 220
 Asp Phe Val Tyr Gly Ile Pro Glu His Ala Thr Ser Phe Ala Leu Lys
 225 230 235 240
 Pro Thr Lys Gly Pro Asn Val Glu Glu Tyr Ser Glu Pro Tyr Arg Leu
 245 250 255

Phe Asn Leu Asp Val Phe Glu Tyr Leu His Glu Ser Pro Phe Gly Leu
 260 265 270
 Tyr Gly Ser Ile Pro Phe Met Ile Ser His Gly Lys Ala Arg Gly Ser
 275 280 285
 Ser Gly Phe Phe Trp Leu Asn Ala Ala Glu Met Gln Ile Asp Val Leu
 290 295 300
 Gly Ser Gly Trp Asn Ser Asp Glu Ser Ser Lys Ile Met Leu Pro Ser
 305 310 315 320
 Asp Lys His Arg Ile Asp Thr Leu Trp Met Ser Glu Ser Gly Val Val
 325 330 335
 Asp Thr Phe Phe Phe Ile Gly Pro Gly Pro Lys Asp Val Val Arg Gln
 340 345 350
 Tyr Thr Ser Val Thr Gly Arg Pro Ser Met Pro Gln Leu Phe Ala Thr
 355 360 365
 Ala Tyr His Gln Cys Arg Trp Asn Tyr Arg Asp Glu Glu Asp Val Tyr
 370 375 380
 Asn Val Asp Ser Lys Phe Asp Glu His Asp Ile Pro Tyr Asp Val Leu
 385 390 395 400
 Trp Leu Asp Ile Glu His Thr Asp Gly Lys Lys Tyr Phe Thr Trp Asp
 405 410 415
 Arg Val Leu Phe Pro Asn Pro Glu Glu Met Gln Lys Lys Leu Ala Ala
 420 425 430
 Lys Gly Arg His Met Val Thr Ile Val Asp Pro His Ile Lys Arg Asp
 435 440 445
 Glu Ser Tyr His Ile Pro Lys Glu Ala Leu Glu Lys Gly Tyr Tyr Val
 450 455 460
 Lys Asp Ala Thr Gly Lys Asp Tyr Asp Gly Trp Cys Trp Pro Gly Ser
 465 470 475 480
 Ser Ser Tyr Thr Asp Leu Leu Asn Pro Glu Ile Lys Ser Trp Trp Ser
 485 490 495
 Asp Lys Phe Ser Leu Asp Ser Tyr Val Gly Ser Thr Lys Tyr Leu Tyr
 500 505 510

Ile Trp Asn Asp Met Asn Glu Pro Ser Val Phe Asn Gly Pro Glu Val
 515 520 525
 Thr Met Pro Arg Asp Ala Leu His His Gly Gly Val Glu His Arg Glu
 530 535 540
 Leu His Asn Ser Tyr Gly Tyr Tyr Phe His Met Gly Thr Ser Asp Gly
 545 550 555 560
 Leu Leu Lys Arg Gly Asp Gly Lys Asp Arg Pro Phe Val Leu Ala Arg
 565 570 575
 Ala Phe Phe Ala Gly Ser Gln Arg Tyr Gly Ala Ile Trp Thr Gly Asp
 580 585 590
 Asn Thr Ala Glu Trp Glu His Leu Arg Val Ser Val Pro Met Val Leu
 595 600 605
 Thr Leu Ser Ile Ser Gly Ile Val Phe Ser Gly Ala Asp Val Gly Gly
 610 615 620
 Phe Phe Gly Asn Pro Asp Thr Glu Leu Leu Val Arg Trp Tyr Gln Val
 625 630 635 640
 Gly Ala Tyr Tyr Pro Phe Phe Arg Gly His Ala His His Asp Thr Lys
 645 650 655
 Arg Arg Glu Pro Trp Leu Phe Gly Glu Arg Asn Thr Gln Leu Met Arg
 660 665 670
 Glu Ala Ile His Val Arg Tyr Met Tyr Leu Pro Tyr Phe Tyr Thr Leu
 675 680 685
 Phe Arg Glu Ala Asn Ser Ser Gly Thr Pro Val Ala Arg Pro Leu Trp
 690 695 700
 Met Glu Phe Pro Gly Asp Glu Lys Ser Phe Ser Asn Asp Glu Ala Phe
 705 710 715 720
 Met Val Gly Asn Gly Leu Leu Val Gln Gly Val Tyr Thr Glu Lys Pro
 725 730 735
 Lys His Val Ser Val Tyr Leu Pro Gly Glu Glu Ser Trp Tyr Asp Leu
 740 745 750
 Arg Ser Ala Ser Ala Tyr Asn Gly Gly His Thr His Lys Tyr Glu Val
 755 760 765

Ser Glu Asp Ser Ile Pro Ser Phe Gln Arg Ala Gly Thr Ile Ile Pro
770 775 780

Arg Lys Asp Arg Leu Arg Arg Ser Ser Thr Gln Met Glu Asn Asp Pro
785 790 795 800

Tyr Thr Leu Val Ile Ala Leu Asn Ser Ser Lys Ala Ala Glu Gly Glu
805 810 815

Leu Tyr Ile Asp Asp Gly Lys Ser Tyr Glu Phe Lys Gln Gly Ala Phe
820 825 830

Ile Leu Lys Trp Glu Ala Tyr Ile Phe Gln Met Gln Pro Arg Leu Gln
835 840 845

Leu Ala Val Thr His Phe Pro Ser Glu Cys Thr Val Glu Arg Ile Ile
850 855 860

Leu Leu Gly Leu Ser Pro Gly Ala Lys Thr Ala Leu Ile Glu Pro Gly
865 870 875 880

Asn Lys Lys Val Glu Ile Glu Leu Gly Pro Leu Phe Ile Gln Gly Asn
885 890 895

Arg Gly Ser Val Pro Thr Ile Arg Lys Pro Asn Val Arg Ile Thr Asp
900 905 910

Asp Trp Ser Ile Gln Ile Leu
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Ser Leu Val Leu Ala Tyr Leu Gly Val Cys Leu Gly Ile Thr Leu Ala
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Val Asp Arg Ser Asn Phe Lys Thr Cys Asp Glu Ser Ser Phe Cys Lys
35 40 45

Arg Gln Arg Ser Ile Arg Pro Gly Leu Ser Pro Tyr Arg Ala Leu Leu
50 55 60

Asp Thr Leu Gln Leu Gly Pro Asp Ala Leu Thr Val His Leu Ile His
 65 70 75 80
 Glu Val Thr Lys Val Leu Leu Val Leu Glu Leu Gln Gly Leu Gln Lys
 85 90 95
 Asn Met Thr Arg Ile Arg Ile Asp Glu Leu Glu Pro Arg Arg Pro Arg
 100 105 110
 Tyr Arg Val Pro Asp Val Leu Val Ala Asp Pro Pro Thr Ala Arg Leu
 115 120 125
 Ser Val Ser Gly Arg Asp Asp Asn Ser Val Glu Leu Thr Val Ala Glu
 130 135 140
 Gly Pro Tyr Lys Ile Ile Leu Thr Ala Gln Pro Phe Arg Leu Asp Leu
 145 150 155 160
 Leu Glu Asp Arg Ser Leu Leu Leu Ser Val Asn Ala Arg Gly Leu Met
 165 170 175
 Ala Phe Glu His Gln Arg Ala Pro Arg Val Pro Phe Ser Asp Lys Val
 180 185 190
 Ser Leu Ala Leu Gly Ser Val Trp Asp Lys Ile Lys Asn Leu Phe Ser
 195 200 205
 Arg Gln Glu Ser Lys Asp Pro Ala Glu Gly Asn Gly Ala Gln Pro Glu
 210 215 220
 Ala Thr Pro Gly Asp Gly Asp Lys Pro Glu Glu Thr Gln Glu Lys Ala
 225 230 235 240
 Glu Lys Asp Glu Pro Gly Ala Trp Glu Glu Thr Phe Lys Thr His Ser
 245 250 255
 Asp Ser Lys Pro Tyr Gly Pro Thr Ser Val Gly Leu Asp Phe Ser Leu
 260 265 270
 Pro Gly Met Glu His Val Tyr Gly Ile Pro Glu His Ala Asp Ser Leu
 275 280 285
 Arg Leu Lys Val Thr Glu Gly Gly Glu Pro Tyr Arg Leu Tyr Asn Leu
 290 295 300
 Asp Val Phe Gln Tyr Glu Leu Asn Asn Pro Met Ala Leu Tyr Gly Ser
 305 310 315 320

Val Pro Val Leu Leu₃₂₅ Ala His Ser Phe His₃₃₀ Arg Asp Leu Gly Ile₃₃₅ Phe
Trp Leu Asn Ala₃₄₀ Ala Glu Thr Trp Val₃₄₅ Asp Ile Ser Ser Asn₃₅₀ Thr Ala
Gly Lys Thr₃₅₅ Leu Phe Gly Lys Met₃₆₀ Leu Asp Tyr Leu Gln₃₆₅ Gly Ser Gly
Glu Thr₃₇₀ Pro Gln Thr Asp Ile₃₇₅ Arg Trp Met Ser Glu₃₈₀ Ser Gly Ile Ile
Asp₃₈₅ Val Phe Leu Met Leu₃₉₀ Gly Pro Ser Val Phe₃₉₅ Asp Val Phe Arg Gln₄₀₀
Tyr Ala Ser Leu Thr₄₀₅ Gly Thr Gln Ala Leu₄₁₀ Pro Pro Leu Phe Ser₄₁₅ Leu
Gly Tyr His Gln₄₂₀ Ser Arg Trp Asn Tyr₄₂₅ Arg Asp Glu Ala Asp₄₃₀ Val Leu
Glu Val Asp₄₃₅ Gln Gly Phe Asp Asp₄₄₀ His Asn Met Pro Cys₄₄₅ Asp Val Ile
Trp Leu Asp Ile Glu His Ala₄₅₅ Asp Gly Lys Arg Tyr₄₆₀ Phe Thr Trp Asp
Pro Thr Arg Phe Pro Gln₄₇₀ Pro Leu Asn Met Leu₄₇₅ Glu His Leu Ala Ser₄₈₀
Lys Arg Arg Lys Leu₄₈₅ Val Ala Ile Val Asp₄₉₀ Pro His Ile Lys Val₄₉₅ Asp
Ser Gly Tyr Arg₅₀₀ Val His Glu Glu Leu₅₀₅ Arg Asn His Gly Leu₅₁₀ Tyr Val
Lys Thr Arg₅₁₅ Asp Gly Ser Asp Tyr₅₂₀ Glu Gly Trp Cys Trp₅₂₅ Pro Gly Ser
Ala Ser Tyr Pro Asp Phe Thr₅₃₅ Asn Pro Arg Met Arg₅₄₀ Ala Trp Trp Ser
Asn Met Phe Ser Phe Asp₅₅₀ Asn Tyr Glu Gly Ser₅₅₅ Ala Pro Asn Leu Tyr₅₆₀
Val Trp Asn Asp Met₅₆₅ Asn Glu Pro Ser Val₅₇₀ Phe Asn Gly Pro Glu₅₇₅ Val

Thr Met Leu Lys Asp Ala Val His Tyr Gly Gly Trp Glu His Arg Asp
 580 585 590

Ile His Asn Ile Tyr Gly Leu Tyr Val His Met Ala Thr Ala Asp Gly
 595 600 605

Leu Ile Gln Arg Ser Gly Gly Ile Glu Arg Pro Phe Val Leu Ser Arg
 610 615 620

Ala Phe Phe Ser Gly Ser Gln Arg Phe Gly Ala Val Trp Thr Gly Asp
 625 630 635 640

Asn Thr Ala Glu Trp Asp His Leu Lys Ile Ser Ile Pro Met Cys Leu
 645 650 655

Ser Leu Ala Leu Val Gly Leu Ser Phe Cys Gly Ala Asp Val Gly Gly
 660 665 670

Phe Phe Lys Asn Pro Glu Pro Glu Leu Leu Val Arg Trp Tyr Gln Met
 675 680 685

Gly Ala Tyr Gln Pro Phe Phe Arg Ala His Ala His Leu Asp Thr Gly
 690 695 700

Arg Arg Glu Pro Trp Leu Leu Ala Ser Gln Tyr Gln Asp Ala Ile Arg
 705 710 715 720

Asp Ala Leu Phe Gln Arg Tyr Ser Leu Leu Pro Phe Trp Tyr Thr Leu
 725 730 735

Phe Tyr Gln Ala His Lys Glu Gly Phe Pro Val Met Arg Pro Leu Trp
 740 745 750

Val Gln Tyr Pro Glu Asp Met Ser Thr Phe Ser Ile Glu Asp Gln Phe
 755 760 765

Met Leu Gly Asp Ala Leu Leu Ile His Pro Val Ser Asp Ala Gly Ala
 770 775 780

His Gly Val Gln Val Tyr Leu Pro Gly Gln Glu Glu Val Trp Tyr Asp
 785 790 795 800

Ile Gln Ser Tyr Gln Lys His His Gly Pro Gln Thr Leu Tyr Leu Pro
 805 810 815

Val Thr Leu Ser Ser Ile Pro Val Phe Gln Arg Gly Gly Thr Ile Val
 820 825 830

Pro Arg Trp Met Arg Val Arg Arg Ser Ser Asp Cys Met Lys Asp Asp
835 840 845

Pro Ile Thr Leu Phe Val Ala Leu Ser Pro Gln Gly Thr Ala Gln Gly
850 855 860

Glu Leu Phe Leu Asp Asp Gly His Thr Phe Asn Tyr Gln Thr Arg His
865 870 875 880

Glu Phe Leu Leu Arg Arg Phe Ser Phe Ser Gly Ser Thr Leu Val Ser
885 890 895

Ser Ser Ala Asp Pro Lys Gly His Leu Glu Thr Pro Ile Trp Ile Glu
900 905 910

Arg Val Val Ile Met Gly Ala Gly Lys Pro Ala Ala Val Val Leu Gln
915 920 925

Thr Lys Gly Ser Pro Glu Ser Arg Leu Ser Phe Gln His Asp Pro Glu
930 935 940

Thr Ser Val Leu Ile Leu Arg Lys Pro Gly Val Ser Val Ala Ser Asp
945 950 955 960

Trp Ser Ile His Leu Arg
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<400> 29

Met Arg Tyr His Gly Ile Cys Trp Phe Ile Phe Gln Ala Ala Ile Ile
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Phe Ala Ile Phe Gly Ser Cys Gln Gly Ala Phe Arg His Gln Phe Lys
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Thr Ala Glu Gln Asp Gly Phe Ala Arg Arg Asn Arg Asp Leu Ala Lys
35 40 45

Phe Gln Lys Glu Asn Leu Asn Trp Asn Gly Leu Phe Gln Leu Asn Ser
50 55 60

Ile Ser Tyr Asn Ser Gly Val Val Ser Gly Val Phe Glu Gln Gln Ser
65 70 75 80

Glu Asn Gly Glu Asn Gln His Leu Phe Pro Phe Ser Ile Ser Phe Leu
- 39 -

85										90					95				
Lys	Asn	Asp	Val	Val	Arg	Phe	Gln	Met	Asp	Glu	Lys	Ser	Arg	Leu	Glu				
			100					105					110						
Gly	Thr	Val	Glu	Tyr	Glu	Lys	Asn	Ile	Leu	Thr	Lys	Arg	Arg	Phe	Asp				
		115					120					125							
Ala	Ser	Thr	Glu	Leu	Gly	Phe	Asn	Glu	Arg	Ala	Glu	Val	Tyr	Gly	Lys				
	130					135					140								
Asp	Ala	His	Leu	Leu	Glu	Gln	Thr	Ser	Thr	Ser	Leu	Thr	Ile	Arg	Tyr				
145					150					155					160				
Gly	Ser	His	Gly	Arg	Phe	Thr	Val	Ile	Val	Thr	Phe	Ser	Pro	Phe	Lys				
				165					170					175					
Val	Glu	Phe	Gln	Arg	Asp	Gly	Glu	Pro	Gln	Val	Val	Leu	Asn	Glu	Arg				
			180					185					190						
His	Leu	Leu	Asn	Met	Glu	Tyr	Tyr	Arg	Pro	Lys	Ser	Ser	Arg	Thr	Pro				
		195					200					205							
Glu	Gln	Glu	Ala	Asn	Gly	Met	Trp	Asp	Glu	Thr	Phe	Asp	Asn	Phe	His				
	210					215					220								
Asp	Ser	Lys	Pro	Lys	Gly	Pro	Glu	Ser	Val	Gly	Leu	Asp	Ile	Lys	Phe				
225					230					235					240				
Val	Asp	Tyr	Gly	Asn	Val	Tyr	Gly	Val	Pro	Glu	His	Thr	Ser	Ser	Leu				
				245					250					255					
Ser	Leu	Lys	Glu	Thr	Asn	Asn	Ser	Asp	Ala	Gly	Tyr	Thr	Glu	Pro	Tyr				
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Arg	Leu	Tyr	Asn	Val	Asp	Leu	Phe	Glu	Tyr	Glu	Val	Asp	Ser	Pro	Met				
		275					280					285							
Ser	Gln	Tyr	Gly	Ala	Ile	Pro	Phe	Met	Gln	Ala	His	Lys	Pro	Asn	Ser				
	290					295					300								
Asp	Val	Ala	Val	Phe	Trp	Ser	Asn	Ala	Ala	Ala	Thr	Trp	Ile	Asp	Val				
305					310					315					320				
Glu	Lys	Glu	Ser	Gly	Pro	Ser	Pro	His	Ser	Gln	Ser	Thr	Ser	Thr	His				
				325					330					335					
Trp	Tyr	Ser	Glu	Ser	Gly	Thr	Leu	Asp	Leu	Phe	Ile	Phe	Leu	Gly	Pro				

340										345					350				
Lys	Ala	Ser ₃₅₅	Asp	Val	Tyr	Glu	Ser ₃₆₀	Tyr	Ser	Ala	Leu	Val ₃₆₅	Gly	Arg	Pro				
Leu	Leu ₃₇₀	Pro	Pro	Leu	Phe	Ser ₃₇₅	Ile	Gly	Tyr	His	Gln ₃₈₀	Cys	Arg	Trp	Asn				
Tyr ₃₈₅	Val	Ser	Glu	Glu	Asp ₃₉₀	Val	Leu	Asn	Val	Asp ₃₉₅	Ala	Lys	Phe	Asp	Glu ₄₀₀				
Val	Asp	Met	Pro	Tyr ₄₀₅	Asp	Thr	Ile	Trp	Leu ₄₁₀	Asp	Ile	Glu	Tyr	Ala ₄₁₅	Ser				
Lys	Arg	Arg	Tyr ₄₂₀	Phe	Thr	Trp	Asp	Lys ₄₂₅	Ala	Thr	Phe	Pro	Asn ₄₃₀	Pro	Lys				
Ala	Met	Leu ₄₃₅	Glu	Lys	Leu	Asp	Ser ₄₄₀	Lys	Ser	Arg	Lys	Leu ₄₄₅	Ile	Val	Ile				
Leu	Asp ₄₅₀	Pro	His	Ile	Lys	Asn ₄₅₅	Asp	Pro	Asn	Tyr	Phe	Val	Ser	Lys	Glu				
Leu	Ile	Asp	Tyr	Asn	Tyr ₄₇₀	Ala	Val	Lys	Asp	Lys ₄₇₅	Ser	Gly	Val	Asp	Asn ₄₈₀				
Tyr	Asn	Ala	Asp	Cys ₄₈₅	Trp	Pro	Gly	Asn	Ser ₄₉₀	Val	Trp	Val	Asp	Phe ₄₉₅	Phe				
Asn	Pro	Glu	Ala ₅₀₀	Gln	Ala	Trp	Trp	Gly ₅₀₅	Ser	Leu	Tyr	Glu	Phe ₅₁₀	Asp	Arg				
Phe	Glu	Ser ₅₁₅	Asp	Lys	Asn	Leu	Trp ₅₂₀	Ile	Trp	Asn	Asp	Met ₅₂₅	Asn	Glu	Pro				
Ser	Val ₅₃₀	Phe	Arg	Gly	Pro	Glu ₅₃₅	Thr	Ser	Met	His	Arg ₅₄₀	Asp	Ala	Ile	His				
Tyr ₅₄₅	Gly	Gly	Trp	Glu	His ₅₅₀	Arg	Asp	Ile	His	Asn ₅₅₅	Ile	Tyr	Gly	His	Lys ₅₆₀				
Cys	Ile	Asn	Gly	Thr ₅₆₅	Tyr	Asn	Gly	Leu	Ile ₅₇₀	Lys	Arg	Gly	Glu	Gly ₅₇₅	Ala				
Val	Arg	Pro	Phe ₅₈₀	Ile	Leu	Thr	Arg	Ser ₅₈₅	Phe	Phe	Ala	Gly	Thr ₅₉₀	Ser	Ala				
Leu	Ala	Ala	Asn	Trp	Ile	Gly	Asp	Thr	Met	Thr	Thr	Trp	Glu	His	Leu				

595					600					605					
Arg	Gly	Ser	Ile	Pro	Thr	Val	Leu	Thr	Asn	Gly	Ile	Ser	Gly	Met	Ala
	610					615					620				
Phe	Ser	Gly	Ala	Asp	Val	Ala	Gly	Phe	Phe	Gly	Asn	Pro	Asp	Ala	Glu
625					630					635					640
Leu	Phe	Val	Arg	Trp	Tyr	Glu	Thr	Ala	Ile	Phe	Tyr	Pro	Phe	Phe	Arg
				645					650					655	
Ala	His	Ala	His	Ile	Asp	Thr	Lys	Arg	Arg	Glu	Pro	Trp	Leu	Tyr	Gly
			660					665					670		
Glu	Pro	Tyr	Thr	Ser	Leu	Val	Arg	Glu	Leu	Leu	Arg	Ile	Arg	Tyr	Arg
		675					680					685			
Leu	Leu	Pro	Thr	Trp	Tyr	Thr	Ala	Phe	Tyr	Asn	Ser	His	Thr	His	Gly
	690					695					700				
Phe	Pro	Ile	Leu	Tyr	Pro	Gln	Phe	Leu	Met	His	Pro	Glu	Asp	Glu	Glu
705					710					715					720
Gly	Phe	Ala	Ile	Asp	Asp	Gln	Phe	Tyr	Val	Gly	Asp	Ser	Gly	Leu	Leu
				725					730					735	
Val	Lys	Pro	Val	Thr	His	Pro	Ser	Ile	Asp	Lys	Ile	Thr	Ile	Tyr	Leu
			740					745					750		
Ala	Asp	Asp	Glu	Val	Tyr	Phe	Asp	Leu	His	Asp	His	Thr	Glu	Tyr	Ala
		755					760					765			
Gly	Lys	Gly	His	Gln	Val	Val	Pro	Ala	Pro	Leu	Gly	Arg	Val	Pro	Val
	770					775					780				
Leu	Leu	Arg	Gly	Gly	Asn	Ile	Leu	Ile	Thr	Arg	Glu	Arg	Ile	Arg	Arg
785					790					795					800
Ala	Ala	Glu	Leu	Thr	Arg	Asn	Asp	Pro	Phe	Thr	Leu	Thr	Ile	Ala	Val
				805					810					815	
Ser	Lys	Ile	Gly	Lys	Asn	Ala	Ser	Gly	Phe	Leu	Tyr	Leu	Asp	Asp	Gly
			820					825					830		
Val	Thr	Phe	Asn	Tyr	Lys	Lys	Gly	Glu	Tyr	Leu	Ile	Arg	His	Phe	Ser
		835					840					845			
Tyr	Glu	Asn	Gly	Ile	Leu	Thr	Met	Lys	Asp	Ser	His	Ser	Asn	Pro	Pro

850 855 860
 Val Ser Pro Lys Tyr Ser Ser Ser Gln Lys His Leu Lys Val Glu Arg
 865 870 875 880
 Ile Asn Ile Tyr Gly Glu Gln Thr Arg Lys Ser Ile Lys Ile Arg Lys
 885 890 895
 Ile Ile Asp Ser Glu Val Thr Glu Trp Asp Val Ser Val Asp Asp Ser
 900 905 910
 Gly Cys Ile Arg Asn Pro Gln Leu Phe Leu Val
 915 920

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 <211> 647
 <212> PRT
 <213> Arabidopsis thaliana

 <400> 30
 Met Arg Val Val Val Ile Ser Ser Phe Val Ser Val Ser Leu Gln Leu
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 Ser Phe Leu Leu Leu Leu Ala Ser Ala Ile Arg Ser Ser Ser Ser Pro
 20 25 30
 Pro Asn Asp Pro Phe Leu Gly Ile Ser Pro Gln Asp Glu Lys Tyr Tyr
 35 40 45
 Lys Ser Ser Ser Glu Ile Lys Cys Lys Asp Gly Ser Lys Lys Phe Thr
 50 55 60
 Lys Ala Gln Leu Asn Asp Asp Phe Cys Asp Cys Ser Asp Gly Thr Asp
 65 70 75 80
 Glu Pro Gly Thr Ser Ala Cys Pro Thr Gly Lys Phe Tyr Cys Arg Asn
 85 90 95
 Ala Gly His Ser Pro Val Ile Leu Phe Ser Ser Arg Val Asn Asp Gly
 100 105 110
 Ile Cys Asp Cys Cys Asp Gly Ser Asp Glu Tyr Asp Gly His Val Ser
 115 120 125
 Cys Gln Asn Thr Cys Trp Glu Ala Gly Lys Ala Ala Arg Glu Asn Leu
 130 135 140
 Lys Lys Lys Ile Glu Thr Tyr Asn Gln Gly Leu Val Ile Arg Arg Gln
 145 150 155 160

Glu Ile Glu Gln Ala Lys Val Gly Leu Glu Lys Asp Ala Ala Glu Leu
 165 170 175
 Lys Lys Leu Lys Ser Glu Gln Lys Ile Leu Lys Gly Leu Val Asp Gln
 180 185 190
 Leu Lys Asp Arg Lys Glu Gln Ile Glu Lys Val Glu Glu Lys Glu Arg
 195 200 205
 Leu Gln Lys Glu Lys Glu Glu Lys Glu Lys Lys Glu Ala Glu Leu Ala
 210 215 220
 Ala Gln Gln Gly Lys Gly Asp Ala Glu Glu Lys Thr Asp Asp Ser Glu
 225 230 235 240
 Lys Val Glu Glu Ser Ser His Asp Glu Gly Thr Pro Ala Val Ser Gln
 245 250 255
 His Asp Glu Thr Thr His His Asp Glu Ile Gly Asn Tyr Lys Asp Tyr
 260 265 270
 Pro Ser Asp Glu Glu Pro Ala Ala Glu Gly Glu Pro Thr Ser Ile Leu
 275 280 285
 Asp Glu Ala Thr His Thr Asn Pro Ala Asp Glu His Val Val Glu Arg
 290 295 300
 Lys Glu Glu Ser Thr Ser Ser Glu Asp Ser Ser Ser Pro Thr Asp Glu
 305 310 315 320
 Ser Gln Asn Asp Gly Ser Ala Glu Lys Glu Glu Ser Asp Glu Val Lys
 325 330 335
 Lys Val Glu Asp Phe Val Thr Glu Lys Lys Glu Glu Leu Ser Lys Glu
 340 345 350
 Glu Leu Gly Arg Leu Val Ala Ser Arg Trp Thr Gly Glu Lys Ser Asp
 355 360 365
 Lys Pro Thr Glu Ala Asp Asp Ile Pro Lys Ala Asp Asp Gln Glu Asn
 370 375 380
 His Glu His Thr Pro Ile Thr Ala His Glu Ala Asp Glu Asp Asp Gly
 385 390 395 400
 Phe Val Ser Asp Gly Asp Glu Asp Thr Ser Asp Asp Gly Lys Tyr Ser
 405 410 415

Asp His Glu Pro Glu Asp Asp Ser Tyr Glu Glu Glu Tyr Arg His Asp
 420 425 430
 Ser Ser Ser Ser Tyr Lys Ser Asp Ala Asp Asp Asp Val Asp Phe Ser
 435 440 445
 Glu Thr Thr Ser Asn Pro Thr Trp Leu Glu Lys Ile Gln Lys Thr Val
 450 455 460
 Lys Asn Ile Leu Leu Ala Val Asn Leu Phe Gln Thr Thr Pro Val Asp
 465 470 475 480
 Lys Ser Glu Ala Asp Arg Val Arg Lys Glu Tyr Asp Glu Ser Ser Ser
 485 490 495
 Lys Leu Asn Lys Ile Gln Ser Arg Ile Ser Ser Leu Glu Lys Lys Leu
 500 505 510
 Lys Gln Asp Phe Gly Pro Glu Lys Glu Phe Tyr Ser Phe His Gly Arg
 515 520 525
 Cys Phe Glu Ser Lys Gln Gly Lys Tyr Thr Tyr Lys Val Cys Ala Tyr
 530 535 540
 Lys Glu Ala Thr Gln Glu Glu Gly Tyr Ser Lys Thr Arg Leu Gly Glu
 545 550 555 560
 Trp Asp Lys Phe Glu Asn Ser Tyr Gln Phe Met Ser Tyr Thr Asn Gly
 565 570 575
 Glu Lys Cys Trp Asn Gly Pro Asp Arg Ser Leu Lys Val Lys Leu Arg
 580 585 590
 Cys Gly Leu Lys Asn Glu Leu Met Asp Val Asp Glu Pro Ser Arg Cys
 595 600 605
 Glu Tyr Ala Ala Ile Leu Ser Thr Pro Ala Arg Cys Leu Glu Asp Lys
 610 615 620
 Leu Lys Glu Leu Gln Gln Lys Leu Glu Lys Leu Met Asn Gln Asp Lys
 625 630 635 640
 Pro Gln Asn His Asp Glu Leu
 645

<210> 31
 <211> 613

<212> PRT
<213> rice

<400> 31

Met Gly Leu His Ala Ile Leu Leu Leu Leu Leu Leu Arg Ile Ser Ala
1 5 10 15
Ser Ala Ala Ala Ser Arg Pro Pro Leu Asp Thr Leu Gly Ile Pro Pro
20 25 30
Gln Asp Glu Ala Tyr Phe Arg Gly Gly Val Ile Arg Cys Arg Asp Gly
35 40 45
Ser Gly Arg Phe Ala Arg Asp Lys Leu Asn Asp Asp Phe Cys Asp Cys
50 55 60
Pro Asp Gly Thr Asp Glu Pro Gly Thr Ser Ala Cys Pro Glu Gly Lys
65 70 75 80
Phe Tyr Cys Gln Asn Ala Gly His Ser Pro Ile Thr Ile Phe Ser Ser
85 90 95
Arg Val Asn Asp Gly Ile Cys Asp Cys Cys Asp Gly Ser Asp Glu Tyr
100 105 110
Asp Ser Asn Val Thr Cys Lys Asn Thr Cys Trp Glu Ala Gly Lys Ala
115 120 125
Ala Arg Asp Lys Leu Lys Lys Lys Val Ala Thr Tyr Lys Ser Gly Val
130 135 140
Val Ile Arg Asn Gln Glu Ile Gln Lys Ala Lys Val Ala Phe Ala Lys
145 150 155 160
Asp Glu Ala Glu Leu Ala Lys Leu Lys Gly Glu Glu Lys Ile Leu Gln
165 170 175
Gly Leu Val Asp Lys Leu Thr Glu Gln Lys Lys Leu Ile Glu Lys Ala
180 185 190
Glu Glu Glu Glu Arg Leu Arg Lys Glu Lys Glu Glu Lys Arg Met Lys
195 200 205
Glu Glu Ala Glu Lys Gln Ala Ala Asp Glu Lys Lys Ala Ser Asp Ala
210 215 220
Ser Gln Glu Val Asp Ser Gln Glu Asn His Glu Thr Val Gln Glu Asp
225 230 235 240

Glu Ser Lys Val Ala Glu His His Asp Gly His Ala Thr Ser His Asp
 245 250 255
 Asn His Thr Pro Glu Ser Glu Ser Ser Val Glu Gln His Asp Pro Glu
 260 265 270
 Ser Gln Asp Asp Ile Ser Ile Lys Ala Ala Pro Ala Asp Glu Ser Pro
 275 280 285
 Pro Glu Glu Thr Ser Ala Ala Pro Thr Lys Glu Gln Glu Ser Thr Pro
 290 295 300
 Ala Asp Ser Glu Gly Leu Ser Arg Glu Glu Leu Gly Arg Leu Val Ala
 305 310 315 320
 Ser Arg Trp Thr Gly Glu Lys Val Asp Glu Val Ser Lys Asp Asp Lys
 325 330 335
 Asn Glu His Glu Ala Glu His Asp Met Pro Glu His Ser Glu Glu Thr
 340 345 350
 His Glu Asp Glu Ser Asp Val Pro Glu Ser Ala Glu Asp Ser Tyr Ala
 355 360 365
 Gly Tyr His Ser Glu Val Glu Asp Asp Arg His Lys Tyr Asp Asp Glu
 370 375 380
 Asp Phe Ser His Glu Ser Asp Asp Glu Tyr Val Asp Asp His Asp Glu
 385 390 395 400
 His Val Ala Ser Tyr Lys Ser Asp Asp Asp Gln Lys Gly Asp Asp His
 405 410 415
 Ser Asp Phe Thr Ala Ser Gly Gln Ala Ser Trp Leu Asp Lys Ile Gln
 420 425 430
 Gln Thr Val Gln Asn Val Leu Arg Thr Phe Asn Phe Phe Lys Thr Pro
 435 440 445
 Val Asp Leu Ser Glu Ala Ser Arg Val Arg Lys Glu Tyr Asp Asp Ala
 450 455 460
 Ser Ser Lys Leu Ser Lys Ile Gln Ser Arg Ile Ser Thr Leu Thr Asp
 465 470 475 480
 Lys Leu Lys His Asp Phe Gly Lys Glu Lys Glu Phe Tyr Tyr Phe Tyr
 485 490 495

Asp Gln Cys Phe Glu Ser Lys Glu Gly Lys Tyr Val Tyr Lys Val Cys
500 505 510

Pro Phe Lys Lys Ala Ser Gln Val Glu Gly His Ser Thr Thr Ser Leu
515 520 525

Gly Arg Trp Asp Lys Phe Glu Glu Ser Tyr Arg Val Met Gln Phe Ser
530 535 540

Asn Gly Asp Arg Cys Trp Asn Gly Pro Asp Arg Ser Leu Lys Val Arg
545 550 555 560

Leu Arg Cys Gly Leu Asn Asn Glu Leu Asn Gly Val Asp Glu Pro Ser
565 570 575

Arg Cys Glu Tyr Val Ala Val Leu Ser Thr Pro Ala Leu Cys Asp Glu
580 585 590

Gln Lys Leu Lys Glu Leu Glu Gln Lys Leu Lys Ala Ser Ser Asn Gln
595 600 605

Arg His Asp Glu Leu
610

<210> 32
<211> 521
<212> PRT
<213> mouse

<400> 32

Met Leu Leu Leu Leu Leu Leu Leu Leu Pro Leu Cys Trp Ala Val Glu
1 5 10 15

Val Lys Arg Pro Arg Gly Val Ser Leu Ser Asn His His Phe Tyr Glu
20 25 30

Glu Ser Lys Pro Phe Thr Cys Leu Asp Gly Thr Ala Thr Ile Pro Phe
35 40 45

Asp Gln Val Asn Asp Asp Tyr Cys Asp Cys Lys Asp Gly Ser Asp Glu
50 55 60

Pro Gly Thr Ala Ala Cys Pro Asn Gly Ser Phe His Cys Thr Asn Thr
65 70 75 80

Gly Tyr Lys Pro Leu Tyr Ile Leu Ser Ser Arg Val Asn Asp Gly Val
85 90 95

Cys Asp Cys Cys₁₀₀ Asp Gly Thr Asp Glu₁₀₅ Tyr Asn Ser Gly Thr Val Cys
 Glu Asn Thr₁₁₅ Cys Arg Glu Lys Gly₁₂₀ Arg Lys Glu Lys Glu₁₂₅ Ser Leu Gln
 Gln Leu₁₃₀ Ala Glu Val Thr Arg₁₃₅ Glu Gly Phe Arg Leu₁₄₀ Lys Lys Ile Leu
 Ile Glu Glu Trp Lys Thr₁₅₀ Ala Arg Glu Glu Lys₁₅₅ Gln Ser Lys Leu Leu₁₆₀
 Glu Leu Gln Ala Gly₁₆₅ Lys Lys Ser Leu Glu₁₇₀ Asp Gln Val Glu Thr₁₇₅ Leu
 Arg Ala Ala Lys₁₈₀ Glu Glu Ala Glu Arg₁₈₅ Pro Glu Lys Glu Ala₁₉₀ Lys Asp
 Gln His Arg₁₉₅ Lys Leu Trp Glu Glu₂₀₀ Gln Gln Ala Ala Ala₂₀₅ Lys Ala Arg
 Arg Glu₂₁₀ Gln Glu Arg Ala Ala₂₁₅ Ser Ala Phe Gln Glu₂₂₀ Leu Asp Asp Asn
 Met Asp Gly Met Val Ser₂₃₀ Leu Ala Glu Leu Gln₂₃₅ Thr His Pro Glu Leu₂₄₀
 Asp Thr Asp Gly Asp₂₄₅ Gly Ala Leu Ser Glu₂₅₀ Glu Glu Ala Gln Ala₂₅₅ Leu
 Leu Ser Gly Asp₂₆₀ Thr Gln Thr Asp Thr₂₆₅ Thr Ser Phe Tyr Asp₂₇₀ Arg Val
 Trp Ala Ala₂₇₅ Ile Arg Asp Lys Tyr₂₈₀ Arg Ser Glu Val Pro₂₈₅ Pro Thr Asp
 Ile Pro Val Pro Glu Glu Thr₂₉₅ Glu Pro Lys Glu Glu₃₀₀ Lys Pro Pro Val
 Leu Pro Pro Thr Glu Glu₃₁₀ Glu Glu Glu Glu Glu₃₁₅ Glu Glu Pro Glu Glu₃₂₀
 Glu Glu Glu Glu Glu₃₂₅ Glu Glu Glu Glu Glu₃₃₀ Ala Pro Pro Pro Leu₃₃₅ Gln
 Pro Pro Gln Pro₃₄₀ Pro Ser Pro Thr Glu₃₄₅ Asp Glu Lys Met Pro₃₅₀ Pro Tyr

Asp Glu Glu Thr Gln Ala Ile Ile Asp Ala Ala Gln Glu Ala Arg Ser
355 360 365

Lys Phe Glu Glu Val Glu Arg Ser Leu Lys Glu Met Glu Glu Ser Ile
370 375 380

Arg Ser Leu Glu Gln Glu Ile Ser Phe Asp Phe Gly Pro Ser Gly Glu
385 390 395 400

Phe Ala Tyr Leu Tyr Ser Gln Cys Tyr Glu Leu Thr Thr Asn Glu Tyr
405 410 415

Val Tyr Arg Leu Cys Pro Phe Lys Leu Val Ser Gln Lys Pro Lys His
420 425 430

Gly Gly Ser Pro Thr Ser Leu Gly Thr Trp Gly Ser Trp Ala Gly Pro
435 440 445

Asp His Asp Lys Phe Ser Ala Met Lys Tyr Glu Gln Gly Thr Gly Cys
450 455 460

Trp Gln Gly Pro Asn Arg Ser Thr Thr Val Arg Leu Leu Cys Gly Lys
465 470 475 480

Glu Thr Val Val Thr Ser Thr Thr Glu Pro Ser Arg Cys Glu Tyr Leu
485 490 495

Met Glu Leu Met Thr Pro Ala Ala Cys Pro Glu Pro Pro Pro Glu Ala
500 505 510

Pro Ser Asp Gly Asp His Asp Glu Leu
515 520

<210> 33
<211> 506
<212> PRT
<213> yeast

<400> 33

Met Lys Phe Ser Gln Trp Tyr Thr Leu Thr Ala Pro Leu Leu Ile Ser
1 5 10 15

Ser Leu Tyr Thr Val Asn Ala Ala Asn Asp Leu Arg Gly Val Ala Ser
20 25 30

Asp Lys Ser Asp Leu Tyr Lys Pro Asp Ala Lys Gly Asn Trp Lys Cys
35 40 45

Leu Gly Ser Asp Lys Leu Ile Ser Phe Asn Gln Val Asn Asp Asp Tyr
- 50 -

50

55

60

Cys Asp Cys Pro Asp Gly Ser Asp Glu Pro Gly Thr Ser Ala Cys His
65 70 75 80

Asn Gly Lys Phe Phe Cys Lys Asn Thr Gly Tyr Ile Ser Ser Tyr Ile
85 90 95

Pro Ser Asn Arg Val Asp Asp Thr Val Cys Asp Cys Cys Asp Gly Ala
100 105 110

Asp Glu Ser Leu Ile Thr Cys Pro Asn Thr Cys Ala Gln Lys Ala Arg
115 120 125

Glu Tyr Leu Ala Thr Leu Glu Glu His Asn Arg Leu Val Lys Asn Gly
130 135 140

Leu Lys Ile Arg Glu Gln Trp Ala Leu Glu Ser Ala Lys Lys Thr Asp
145 150 155 160

Glu Val Lys Ala Arg Tyr Lys Glu Ile Ser Asp Ser Leu Val Ala Val
165 170 175

Ser Ala Glu Lys Thr Gln Phe Ser Glu Lys Val Glu Lys Met Lys Arg
180 185 190

Ser Thr Asp Leu Gly Ala Glu Ala Val Leu Pro Ser Asp Phe Gln Asp
195 200 205

Leu Arg Val Ala Leu Leu Ser Leu Val Asp Glu Arg Asn Glu Met Gln
210 215 220

Glu Arg Leu Asp Ile Leu Thr Asn Leu Leu Asp Glu Leu Thr Leu Leu
225 230 235 240

Tyr Glu Thr Asp Lys Phe Asp Glu Thr Met Lys Glu Ala Ile Leu Ser
245 250 255

Phe Glu Asp Leu Lys Glu Gln Glu Ile Arg Arg Lys Val Ser Ser Asp
260 265 270

Asp Val His Asn Tyr Leu Glu Ser Cys Asn Asn His Leu Ser Met Leu
275 280 285

Thr Gly Pro Ser Glu Asp Ile Thr Phe Ser Ser Leu Ile Lys Asp Ile
290 295 300

Lys Lys Ile Leu Asn Ser Leu Val Trp Asn Ile Lys Leu Ser Leu Ile
- 51 -

305		310		315		320
Asn Phe Gly Ile	Leu 325	Ser Pro Ser Ala	Ser 330	Ser Thr Pro	Leu Thr 335	Asp
Ser Glu Ser Tyr 340	Arg Arg Phe Glu 345	Ala Ala Gln Arg Asp	Leu 350	Asp Ala		
Ala Glu Glu 355	Asn Glu Lys Ser	Leu 360	Glu Lys Glu His	Thr 365	Lys Leu Met	
His Glu 370	Leu Glu Tyr His	His 375	Gly Trp Asp	Leu Tyr 380	Arg Ala Ile Lys	
Gly 385	Met Glu Thr Lys	Arg 390	Glu Ile Gly Gly Tyr 395	Thr Tyr Lys Val	Val 400	
Phe Tyr Glu Asn	Val 405	Phe Gln Asp Ser	Ile 410	Leu Leu Gly Asn	Phe 415	Ala
Ser Gln Glu Gly 420	Asn Val Leu Lys Tyr 425	Glu Asn Gly Gln	Ser 430	Cys Trp		
Asn Gly Pro 435	His Arg Ser Ala	Ile 440	Val Thr Val Glu	Cys 445	Gly Val Glu	
Asn Glu 450	Ile Val Ser Val	Leu 455	Glu Ala Gln Lys	Cys 460	Glu Tyr Leu Ile	
Lys 465	Met Lys Ser Pro	Ala 470	Ala Cys Ser Pro	Asn 475	Gln Leu Lys Gln	Ser 480
Leu Leu Asn Thr	Gln 485	Asn Ser Ala Tyr	Glu 490	Asp Ala Val Asn	Gly 495	Met
Glu Asp Lys	Glu 500	Ser Ser Val Asp	Glu 505	Leu		